

(a) *Final waterline.* The final waterline, in the final condition of sinkage, heel, and trim, must be below the lower edge of openings such as air pipes and openings closed by weathertight doors or hatch covers. The following types of openings may be submerged when the tankship is at the final waterline:

(1) Openings covered by watertight manhole covers or watertight flush scuttles.

(2) Small watertight cargo tank hatch covers.

(3) A Class 1 door in a watertight bulkhead within the superstructure.

(4) Remotely operated sliding watertight doors.

(5) Side scuttles of the non-opening type.

(b) *Heel angle.* (1) Except as described in paragraph (b)(2) of this section, the maximum angle of heel must not exceed 15 degrees (17 degrees if no part of the freeboard deck is immersed).

(2) The Commanding Officer, Marine Safety Center will consider on a case by case basis each vessel 492 feet (150 meters) or less in length having a final heel angle greater than 17 degrees but less than 25 degrees.

(c) *Range of stability.* Through an angle of 20 degrees beyond its position of equilibrium after flooding, a tankship must meet the following conditions:

(1) The righting arm curve must be positive.

(2) The maximum righting arm must be at least 3.95 inches (10 cm).

(3) Each submerged opening must be weathertight.

(d) *Progressive flooding.* Pipes, ducts or tunnels within the assumed extent of damage must be either—

(1) Equipped with arrangements such as stop check valves to prevent progressive flooding to other spaces with which they connect; or

(2) Assumed in the design calculations required by §172.130 to flood the spaces with which they connect.

(e) *Buoyancy of superstructure.* The buoyancy of any superstructure directly above the side damage is to be disregarded. The unflooded parts of superstructures beyond the extent of damage may be taken into consideration if they are separated from the damaged space by watertight bulk-

heads and no progressive flooding of these intact spaces takes place.

(f) *Metacentric height.* After flooding, the tankship's metacentric height must be at least 2 inches (50mm) when the ship is in the upright position.

(g) *Equalization arrangements.* Flooding equalization arrangements requiring mechanical operation such as valves or cross-flooding lines may not be assumed to reduce the angle of heel. Spaces joined by ducts of large cross sectional area are treated as common spaces.

(h) *Intermediate stages of flooding.* If an intermediate stage of flooding is more critical than the final stage, the tankship must be shown by design calculations to meet the requirements in this section in the intermediate stage.

[CGD 79-023, 48 FR 51040, Nov. 4, 1983, as amended by CGD 88-070, 53 FR 34537, Sept. 7, 1988]

Subpart G—Special Rules Pertaining to a Ship That Carries a Bulk Liquefied Gas Regulated Under Subchapter O of This Chapter

§ 172.155 Specific applicability.

This subpart applies to each tankship that has on board a bulk liquefied gas listed in Table 4 of part 154 of this chapter as cargo, cargo residue, or vapor.

§ 172.160 Definitions.

As used in this subpart—

(a) *Length* or *L* means the load line length (LLL).

(b) *MARVS* means the Maximum Allowable Relief Valve Setting of a cargo tank.

§ 172.165 Intact stability calculations.

(a) Design calculations must show that 2 inches (50mm) of positive metacentric height can be maintained by each tankship when it is being loaded and unloaded.

(b) For the purpose of demonstrating compliance with the requirements of paragraph (a) of this section, the effects of the addition of water ballast may be considered.